At the Head of the Table

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Nec solum gens illa sua contenta salute
Excubat hospitibus, contraque nocentia monstra
Psyllus adest populis. LUCAN, IX. 909*

IN the fourth century there lived at Cyrene "a man of many and wandering thoughts" (Mrs. Browning), Synesius by name. Among his writings is a book called *Praise of Baldness*. He reflects that hair is the mark of the beast, that man is in the main bald and that with dogs, the more hair, the less sense. "So the balder a man is, the wiser and the more divine we may take him to be. Hair like the adornment of growing corn withers when the fruit, here the brain, is ripe. Of all shapes the sphere is most perfect—and that is the shape of the bald head," (T. R. Glover's *Life and Letters in the Fourth Century)*. Our head is our most heavenward part. The best of men, priest and philosophers, are all painted as bald. Synesius hoped that the "lovers of hair" (Φιλόκομοι) would be ashamed and adopt the reasonable and honorable practice of shaving, but always pay special honor to those who do not need the barber. This allusion, although rather facetious, is not entirely inapposite to the thought implied by the title of this paper, as it not only draws attention to the relative importance of the human head, but also refers to what goes on within the calvarium of him who officiates at the head of the operating table.

In further simile, witness the influences of the myriad and multiform functionings as they play one upon another, now controlling, now being affected; almost assuring a beauty behind all phenomena; active through them, immanent, beneficent. A good example comes from the recent work of Smith,[8] showing the presence in the cat, dog, and monkey of cortical areas possessing similar cytoarchitectural structure and yielding physiological responses, which presence suggests the existence of a fundamental plan for the cortical control of respiration in the general scheme of cerebral cortical evolution. This observation has been confirmed, indeed, extended by Bailey and Sweet,[1] division of neurology and neurosurgery, University of Chicago Clinics, in their statement that from the orbital surface of the frontal lobe an area in the gyrus orbitalis near the olfactory tract was found to give rise, upon stimulation, to inhibition of respiration, rise of blood pressure and decrease in the tonus of gastric musculature. May these apogean similitudes, in fancy, be given the anesthetist as he uses his senses in endeavor to guide the one who suffers.

We must remember that this quality of keeping watchful guard over the patient has not been acquired exclusively by the anesthetist. He has, in truth, inherited it with gratitude from his predecessors in medicine generally the world about, of whom there are no better examples than the founders of the hospitals, and the medical schools, societies and journals of this your Golden State. Immortal in California medicine[5,6,7] are such names as Father Junipero Serra and Dr. Pedro Prat, pioneers of the eighteenth century; Dr. Richard Den, who answered the layman's question, "What is Mrs. So-and-so's ailment?" with the simple parry, "sickness"; Elias S. Cooper, the founder, in 1858, of the medical department of the University of the Pacific, which in 1908 became the School of Medicine of Stanford University; Hugh H. Toland, founder, in 1864, of the Toland Medical College, which became the Medical School of the University of California; Levi Cooper Lane, who established the library which still bears his name; and Joseph P. Widney, the great educationalist, who incepted, in 1885, the Medical School of the University of Southern California, one of whose deans, Walter J. Barlow, gave the library which bears his name. There are many other exemplars, revered equally by the general practitioner and the specialist.

The epigraph of this essay is taken from Lucanus and would seem not too inappropriately placed as it implies that we belong to a group of individuals who unselfishly keep guard over those who suffer. It draws attention to the exercise of thought and, as well, to the doing of deeds by the anesthetist in the interest of the patient. "At the head of the table" an anesthetist uses his senses momentarily on behalf of the one who is receiving surgical attention. George Malcolm Stratton,[9] professor of psychology in the University of California, from his translation of *Theophrastus on the Senses*, shows that this Greek author pointed out that when the senses are functioning properly, they lead to truth, and that "In the usual course of things perception is 'in accord with nature'; like the knowledge process generally, it is naturally aligned with what is better, working to our advantage, rather than to our confusion and loss." Pascal wrote that "Man is obviously made to think. It is his whole dignity and his whole merit; and his whole duty is to think as he ought."

L'homme est visiblement fait pour penser. C'est toute sa dignité et tout son merite, et tout son devoir est de penser comme il faut.
Les Pensées de BLAISE PASCAL (1623-1662).

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*Translation: And that group of persons, not satisfied with safety for themselves, keep guard over sufferers and aid mankind against deadly monsters.

Let us from such *lessons seek and find instruction with an humble mind* (Southey, *His Books)*. Let us envisage a hospital with a department of anesthesia whose personnel is composed of graduates in medicine. Let us visualize these as organized, not only to give service as anesthetists, but also to provide opportunity for the young doctor who desires to learn the subject, so to specialize. There are, already, several such centers of learning and (happily) their numbers are steadily increasing. Of the "voice" of any one of some of these, we may say, in words like those of Sir Arthur Quiller-Couch *(Studies in Literature: The Commerce of Thought, VIII)*, "The fame of it spreads almost as pollen is wafted on the wind: but spreads, and alights, and fertilizes." For a sectional meeting of anesthetists in Kingston, Ontario, I[2] described the three-year diploma course in anesthesia presently functioning in the Department of Anesthesia at McGill University. Let me quote one part of that description:

"In this course the aspirant must have had one year of internship in an approved hospital, preferably in the department of internal medicine. Throughout the three years, the candidate resides in one of six hospitals, moving from one to another every six months. In this rotative manner the individual gains a diversity of experience under the tutelage of many qualified anesthetists. The benefits of this many-sided method of acquiring skill are readily evident, for he who learns from many masters is bound to be more versatile, more Jeffersonian and more percipient than he who ranges under one rubric."

He, who at the head of the table, from an anesthesiological point of view, regulates the state of affairs inobtrusively and in concord with the surgeon, has two main duties to perform: firstly, the conduct of all that has to do with the anesthesia; and secondly, the guidance of those who are in assistance and are there to learn anesthesia. These two offices are fulfilled virtually the one with the other. For example, in a given case, with the pains of taking care to be prepared for eventualities, explanations are given for all that is done. During the operation, the procedure is considered and the occurrences discussed, in soft voice not to distract those at the rest of the table. In the postoperative period, similar vigilant attention is paid to the carrying out of both of these two intensely interesting obligations. Thus may young men learn anesthesia as they help in no small degree. They may say of themselves, with Wordsworth,

> *That we can feed this mind of ours*
> *In a wise passiveness.*
> *Think you, 'mid all this mighty sum*
> *Of things for ever speaking,*
> *That nothing of itself will come,*
> *But we must still be seeking?*
>
> EXPOSTULATION AND REPLY

In the realm of anesthesia, art will little wane, nor will science long lag. Never shall either take to bed, and expire, and be beatified; indeed, never even be

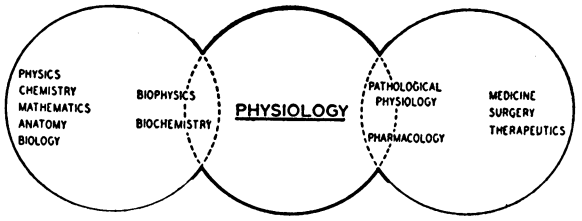

Figure 1

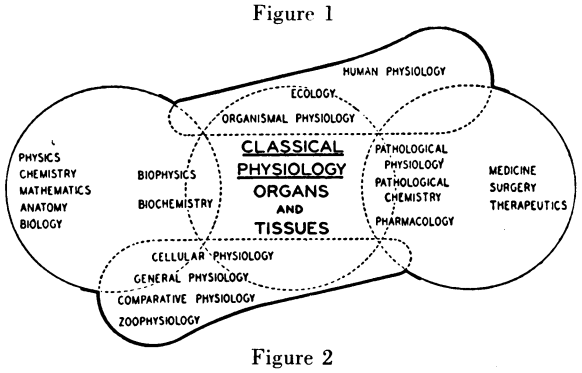

Figure 2

faded, jejune, effete; never, as long as there is confluence of deep thought among young men, in laboratory and in clinic, to face and to solve perplexities; to find and to tap wells more and more abundant, fresh and pure. And, the sources of knowledge are many as they extend to our specialty. One is not long "at the head of the table" before he is convinced of the importance of being familiar with the *classical physiology of organs and tissues* as it still remains squarely in the middle of the picture drawn by Eugene M. Landis,[4] of Harvard University, and reproduced here in Figures 1 and 2 (permission gratefully acknowledged). "This [*classical physiology*] blends in one direction with cellular, general, and comparative physiology, all leaning towards physics, chemistry and biology. At the other end of the scale organismal physiology, ecology and human physiology lean toward pathological physiology and medicine, from which, in fact, many of the truly organismal problems and quantitative studies on man have originated." When we consider that "this multiplicity of subspecialties is a stimulus, an opportunity and a burden, all at the same time," that is, to the physiologist, we should spare no effort in associating ourselves with and learning from him as well as the anatomist, the biochemist, the biophysicist, the pathologist, and the pharmacologist. Also, in practical manner, we should encourage *apt* young physician-anesthetists to become skilled at research and proficient at teaching. Everybody knows that there is at present a direful dearth of anesthetists, and you and I know that many a center is in need of someone capable of guiding a department of anesthesia with regard to the best interest of the patient, the training of personnel and the carrying out of investigation.

And now, speaking of research, we may be assured that there will always be frontiers for inquiry in anesthesia, frontiers wide and deep, to be pierced

following progress in the basic sciences. During the past 15 years especially we have witnessed tremendous advancement in our knowledge of the chemistry and physical chemistry of body processes. We have long known that the remarkable chemical reactions in the cell are brought about by catalysts or enzymes which are capable of accomplishing almost instantaneously feats of synthesis and degradation in an aqueous medium and at 37° C. which in the laboratory cannot be achieved except by prolonged chemical procedures requiring high temperatures and drastic treatment with harsh reagents. It is only recently, however, that the vast accumulation of information concerning these enzyme-catalyzed reactions has been integrated into a coherent science of enzymology. When we consider that each cell contains an array of enzymes which operate side by side and in close coordination, simultaneously building up and breaking down dozens of complex products of metabolism, we can appreciate the delicacy of the equilibrium within the cell and the complex physiological equilibrium between all the cells of the body. Too few of us appreciate how sensitive the cellular enzymes are to disturbances in the composition of the cellular fluid. Very slight changes in the content of water, electrolyte, or metabolites, or the presence of foreign substances may seriously disturb the cellular enzymes. Thus, what we call health is fundamentally a chemical and physiological equilibrium. We all know the severe repercussions of water or salt depletion, malnutrition, hypoxia, renal impairment and so forth, but we seldom think of these diseases in terms of disturbed enzyme function. The action of drugs and the phenomenon of poisoning also are simple manifestations of the interference with normal enzyme activity. When the disturbance becomes severe or prolonged, the damage may be irreparable. The recovery of the patient depends on the restoration of the normal chemical composition of the cell fluids and the recovery of normal enzyme function.*

In the light of these basic considerations, the mechanism of the processes of disease becomes more intelligible. Furthermore, we appreciate how important it is to use drugs with the greatest possible discretion and always to be mindful of the importance of adequate nutrition, of oxygen supply and of the maintenance of salt and water balance.

We learn, too, that the distribution of enzymes in all organisms, be they plant or animal, ameboid or human, is gene-controlled and subject to the laws of heredity. Now and then we meet with an individual who apparently enjoys good health, but who throughout life excretes pentose sugar in the urine, or may excrete phenyl pyruvic acid as a result of some aberration in the metabolism of tyrosine or phenyl alanine. Again, the cells of the black areas of the skin of an animal contain certain enzymes which are capable of producing the black pigment melanin, whereas these enzymes are lacking in the cells of the white areas. Whether certain abnormalities we meet with are caused by the complete lack of one or more enzymes, or a partial lack, or a lack of the enzymes in a specific tissue, remains to be elucidated. Following the same line of observation, we know that individuals by inheritance may possess a predisposition to certain types of failure, or, on the contrary, an exceptional degree of resistance and stability. A knowledge of the individual's family tree is all to the good at any time but is especially important in the field of preventive medicine which is concerned with keeping people well.

The nutritional status of the patient is another consideration that has come to the fore since the days of the late war. Although previously known, it has not been given much attention that the undernourished patient is a relatively poor surgical risk and that the patient in good nutritional condition not only withstands trauma better but makes a smoother and more rapid recovery afterward. It is common knowledge also that the undernourished patient is more liable to liver damage following surgical operation and from drugs. We now realize that in the past we have paid too little attention to the caloric and other nutritional requirements of the patient. We are aware, too, that it is practically impossible to restore the chronically undernourished individual to normal within a short time simply by correcting his nutrition. In future the nutrition of the patient doubtless will be a matter of primary concern.

From the realm of chemistry and pharmacology, the anesthetist can expect an ever increasing number of new agents. While the relationship between chemical structure and biological activity is still obscure, the astounding progress of recent years in the field of synthetic chemistry augurs well for new fundamental advances in our understanding of the action of specific chemical groups or structures on enzyme activity of the cell. Whatever advances may be made in the realm of pharmacology, one should still feel that any biologically active agent ought to be used with discretion. As a general rule the use of any drug should not be expected to correct the basic cause of the disturbance.

Plutarch, the sage of Chaeronea, points out that geographers used to thrust into the extremities of their maps those countries that were unknown to them, remarking at the same time, that all beyond is hills of sand, and haunts of wild beasts, frozen seas, marshes, and mountains that are inaccessible to human courage or industry. This hypothetical method of reasoning may not now be allowed with the dispersing of hyperborean cloud by scientific advances. The anethesiologist will always be interested in the progress of the fundamental sciences, indeed, may often collaborate. Similarly, too, he will keep himself acquainted with all else that goes on in the whole of classical physiology. Has he not turned his attention with enthusiasm to the works of Knisely, Block, Eliot and Warner[3] on *Sludged Blood?* These observers have defined certain prop-

*I am deeply indebted to Orville F. Denstedt, Associate Professor of Biochemistry at McGill University, for guidance in these remarks.

erties of normal blood, of blood flow, and of the vessel walls; have given evidence that these properties are necessary for the functioning of the circulatory system; have described visible responses of the vascular system and/or blood to specific stimuli; have described visible pathological structures and processes; and have set resultant goals for therapeutics. The articles of these investigators are well worth studying inasmuch as they summarize, in part, that their observations, experiments, and deductions supply evidence that the undispersed blood cells provide a common, easily understandable set of factors whereby many diseases can and do damage the bodies of lower animals and of man. They express the hope that as we learn how to keep blood fluid and from becoming agglutinated, or should we say, aggregated, how to keep the vessel walls intact, the red cells from being destroyed, and blood volume adequate; many effects of other pathological mechanisms, in the authors' words, "will stand out clearly, unobscured by the sludge mechanisms. Each will, of course, then receive the undivided attention it merits. The sludges are now ready for study by all the intensive investigative methods our age affords."

The mind of the anesthetist grows accustomed to dwell upon such subjects as I have tried to portray, even, at times, when not at the head of the table. To be sure, I might multiply them and you will agree that they are inextricably intertwined. With training, as time goes on, there comes to the anesthetist, in distinct human manner, the power to see and to know, to feel spontaneously and to think with understanding. He will attain the ἡ ἀθαυμαστία attitude of philosophers, that is, of not wondering at anything; will attain *divine tranquility* which Tennyson defines so well. He might be likened to Louis de Bourbon in the words of Bossuet:

> *Ses partis lui rapportent jusqu'aux moindres choses: on l'éveille à chaque moment; car il tenait encore pour maxime, qu'un habile capitaine peut bien être vaincu, mais qu'il ne lui est pas permis d'être surpris.*
>
> ORAISON FUNEBRE.
> Prononcée dans l'église de Notre Dame de Paris le 10 Mars 1687.

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